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MEMORIAL TO CONGRESS

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CULTIVATION OF THE CINCHONA TREE IN THE UNITED STATES.

BY THE

AMERICAN MEDICAL ASSOCIATION.

PHILADELPHIA:
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MEMORIAL TO CONGRESS.

To the Honorable Senate and House of Representatives of the United States of America.

The American Medical Association, representing the whole of the regular profession throughout the United States, would respectfully present, for the consideration of your honorable body, the following memorial on the cultivation of the cinchona in the United States.

Upon the importance of the bark of this tree for the good of mankind it is unnecessary to dwell at any length. With especial reference to the use of cinchona and its preparations, in the treatment of a class of diseases peculiar to tropical and miasmatic localities, an eminent authority says:—

"There is no substitute for these. They are universally relied on for this purpose. In all countries, and at all periods, since the discovery of the properties of this invaluable and incomparable substance, amidst all the conflicting dogmas of different medical doctrines, Peruvian bark has never failed to sustain its reputation, and to answer the expectations that have rested upon it. Amidst the manifold uncertainties of medical science, and the perpetual contingencies of medical art; amidst the disheartening scientific infidelity which has lately been taking possession of the medical mind, shaking to its deepest foundations the firm old faith in the potency of drugs, and threatening to overturn and demolish it altogether, it is gratifying and consolatory to feel that here, at least, we stand upon solid ground; that here we may hold that there is one great and important therapeutical relationship definitely and positively ascertained and established, defying alike the open assaults of quackery from without, and the treacherous machinations of indolent skepticism from within."—(*Bartlett on Fevers.*)

But, although, as thus indicated, its chief value as a therapeutic agent in the treatment of this wide-spread class of diseases cannot be overestimated, yet it is not here alone that the physician finds it a ready servant to do his bidding; it is so highly valued for its tonic properties that many have expressed the belief that, with this in their hands, they do not need or desire any other articles of this class. As a preventive of these diseases it is also of great value. In exposure to malaria an almost certain immunity from danger may be obtained by the use of this substance in some one of its preparations. A collection of facts, illustrating and conclusively proving this point, has been published by the Sanitary Commission in a little monograph, entitled "Quinine as a Prophylactic against Malarial Diseases."—(*Doc. D. U. S. San. Com.*)

But perhaps a more convincing proof of the high estimation in which this substance is held may be found in the figures which indicate the amount of the bark and of its active principles imported for our use, and the price paid for the same. The figures are from the reports of the Secretary of the Treasury on Commerce and Navigation, as quoted by Dr. Thomas Antisell, of the Agricultural Department, in an article upon the cultivation of the cinchona in the United States, in the report of the Commissioner of Agriculture for the year 1866.

In a period of six years (from 1859 to 1865) there were imported

Of bark no less than	1,631,876 lbs.,	of the value of	$1,874,112.
Of all the salts of quinine,	7,526 lbs.,	"	287,138.

Dr. Antisell furnishes also in this article a statement of the amount consumed or purchased, for the use of the United States army, for the period of five years, from Jan. 1, 1861, to Dec. 31, 1865, inclusive, as communicated to him by the Surgeon-General.

Sulphate of quinine,	595,544 oz.
" cinchona,	343,226 oz.
Powdered Calisaya bark,	259,258 oz.

In view of the great medicinal value of this bark, it is no great wonder that the attention of scientific men was early attracted to an investigation of the nature and habit of the tree which produced it. And yet no description of the tree was published until the lapse of a whole century after attention was first especially drawn to its properties in 1638, by the cure of the Countess of Cinchon, wife of the viceroy of Peru, by its use. In 1738 La Condamine published a description of the cinchona, accompanied by a draw-

ing. This learned man had been sent to Peru by the Academy of Sciences of France to measure a degree of the meridian. In company with Joseph de Jussieu, the botanist of the expedition, he visited the localities which furnished the bark, with the view of examining and describing the tree. Jussieu remained to prosecute these investigations after the rest of the expedition had returned to France, but on his own return, in 1771, the condition of his health prevented him from publishing the results of his labors. Five years later Dombey was instructed to make a collection of the plants of Peru. He accompanied a Spanish expedition sent out for the same purpose under the direction of Ruiz and Pavon. Dombey returned in 1785, Ruiz and Pavon four years later. Even the learned Humboldt was induced by his interest in the matter to visit and explore the quinine regions. After that time many more entered this field of investigation, among whom we may mention Weddell, De Londre, Hasskarl, Markham, and Howard.

The first attempts to acclimate the tree in other countries than those to which it is indigenous were unsuccessful. De la Condamine, who attempted to transport some young trees from Peru, was so unfortunate as to have them washed overboard after eight months of careful nursing. Dr. Weddell carried with him to Paris some seeds, which were planted in the Jardin des Plantes in 1848. About the same time, under instructions from the Dutch government, Dr. Hasskarl obtained some young trees, and planted them in Java.

As early as 1839, Dr. Forbes Royle recommended the English government to undertake the cultivation of the cinchona in certain localities in India. An official proposal was not made, however, until 1852. This proposal having been referred by the government to Dr. Royle, he zealously urged its acceptance by the government, for reasons of economy. Dr. Royle did not, however, live to see the accomplishment of his desires. In 1859, and after the death of Dr. Royle, Lord Stanley, Secretary of State for the Colonies, intrusted Mr. Clements R. Markham with the duty of superintending the whole matter of selecting and transplanting the tree. He was aided by Mr. Richard Spruce, an able botanist, who forwarded 529 plants, 1000 cuttings, and at least 100,000 dried seeds to India, where a site upon the Neilgherry Mountains had already been prepared for their reception by Mr. Markham, and where the plantation was commenced in 1860. This attempt has met with perfect success. In May, 1866, we find the number of

plants to be, according to the official report, 1,123,645. The analyses of the bark made by Mr. Howard and others have been very favorable, proving that the plant may be transplanted, and that, under the proper conditions of cultivation, it will furnish a bark equally efficient with that brought from South America.

There remain but two questions, we think, to be discussed, when the matter will be seen in its proper light. 1. Is not the supply so near at hand as South America inexhaustible? 2. Have we within the limits of our own country the proper climatic and other conditions to grow the plant with success?

With regard to the first of these questions a single quotation from Mr. Markham's *Travels in Peru and India* will be a sufficient answer. "A century ago, Condamine raised a warning voice against the destruction that was going on in the forests of Loxa. Ulloa advised the government to check it by legislation; soon afterwards Humboldt reported that 25,000 cinchona trees were destroyed every year, and Ruiz protested against the custom of barking the trees, and leaving them to be destroyed by rot. But nothing was done in the way of conservancy, either by the government or by private speculators whose subsistence depended on a continued supply of the bark. Dr. Weddell, alluding to this recklessness as regards C. calisaya, observes that 'the forests of Bolivia, rich as they are, cannot long resist the continued attacks to which they have been recently exposed. He who, in Europe, sees these enormous and ever-increasing masses of bark arrive, may perhaps believe that they will continue to do so; but he who sees the cinchona trees in their native forests, and knows the real truth, is obliged to think otherwise.' . . . . Then, again, the supplies of bark from South America are not nearly sufficient to meet the demand, and the price is kept so high as to place this inestimable remedy beyond the means of millions of natives of fever-visited regions."

In reply to the second question we would present the following facts as to California, which render it a field where cinchona may be cultivated with success.

Perhaps in no other part of the world will there be found such a multiplicity of climates in juxtaposition to each other, constituting, as it were, a heterogeneous mixture of the Tropical and the Arctic.

A glance at the topography of the State will at once give some idea of this peculiarity. California covers about 189,000 square

miles, between 32° 30′ and 42° of north latitude, and is traversed throughout its whole extent by two distinct lines of mountain ranges, while its southeastern limits stretch off towards the 114th degree of west longitude, into the table-lands of New Mexico.

Sloping back to the first of these mountain ranges is a long line of coast under the control of the ocean—being the only portion of the State preserved from desiccation during the rainless summer, by showers of mist—which has a uniform climate of about 56°, the mean temperature of any one month never exceeding 61°, and never falling below 50°. The extensive region bordering on the great Bay of San Francisco, which seems to adopt one-half of its climatic features from the ocean, and the other half from the interior and more heated valleys, is inexhaustible in agricultural resources. The Pajaro, and some other valleys further south, to which the oceanic winds gain access through gaps in the Coast Range mountains, belong also to the same system, as well as the Sacramento and San Joaquin valleys, although in a less degree, these latter being further removed from the ocean. The mean temperature of the two last-named valleys is about 60°; while the hottest day is 94°, and the coldest 32°. Next we have the interior mountain region (Sierra Nevada), with innumerable little valleys, buried more or less in snow during the winter, and converted by the summer's sun at midday almost into furnaces, and yet luxuriant with all kinds of delicious fruits. Finally, the southern region, which includes nearly one-fourth of the State, being removed alike from both extremes of temperature which operate, as we have just seen, in the more northern parts, and uninfluenced either by mountain or ocean, enjoys a most genial and equable climate. Moreover, it has been found, practically, that California covers all the zones that belt the earth with climatic differences, for there is scarcely a cereal, fruit, plant, or tree, wheresoever it may be indigenous, that cannot be grown or nurtured in the open air in some part of this State. Another remarkable fact connected with the complex atmospherical conditions of California is that the well-known ordinary effects of latitude, longitude, and altitude seem to bear with but comparatively little direct relations in some portions of the State. In the more southerly part of the interior mountain system, the general character of the vegetation has obtained for these mountains the title of the "Alps of California," but their analogue is found in the arctic zone rather than in Switzerland. In the Swiss Alps, trees are not found higher than 6200 feet above the sea.

In the California Alps, trees are found 11,000 feet above the sea, and good pasturage extends from 5000 to 10,000 feet above the sea level, and even higher—up to the very crests of the peaks. At 3500 feet above sea level the dense forest begins. The trees are mostly sugar and yellow pine, Douglass spruce, fir, and bastard cedar. Along the western slope, at an altitude of 5000 to 7000 feet, the big trees, or giant *sequoias*, are abundant, not merely occurring in isolated groves, but scattered abundantly in common with the timber for a distance of at least twenty-five miles along the tributaries of Kings, Kewent, and Kern rivers.

Considering, therefore, the peculiarity and variety of the climatic conditions and vegetable productions of California, it can scarcely be doubted, that a locality may be found here for the propagation of the cinchona as readily as in India, where its cultivation has been attended with success. As is well known the native habitat of the cinchona genus is in the mountain region of South America, from 10° north latitude to 20° south of the equator, and extending eastward from the Peruvian Andes to the confines of Brazil, at elevations varying from 6000 to 11,000 feet. The most esteemed kinds are found between 7° north and 15° south, and at an average temperature of about 68°; but it has been recently ascertained that on the dry slopes of the central Cordillera of New Grenada, a most valuable species flourishes in a temperature varying between two ranges, thus: Lower limit—day, up to 59° to 60°; night, 46° to 48°. Upper limit—day, up to 40° to 48°; night, 35° to 36°. At the lower limit the night-temperature at times ran down to freezing. Now the success attending the plantation of these trees at Sikhim and Jamaica—stations far removed in latitude and absolute elevation from their natural habitat—and especially on the Neilgherry Mountains and country south of Calcutta, shows satisfactorily that, if we can obtain an equable climate and a sufficient rainfall within the limits of the United States, they will flourish here also as well. Following out this conclusion, Dr. Thomas Antisell, in his elaborate contribution on the subject of this communication, in the United States Agricultural Report for 1866, recommends the experiment of a plantation in this State (California) at some distance from the coast in San Luis Obispo, and San Diego counties. The following abstracts of mean temperatures of the district at the base of the Sierra Nevada, from 40° to 32° north latitude, extracted from his report, will serve to contrast this locality with the stations in the East Indies: Spring 55° to

65°—range 10°; summer 70° to 80°—range 10°; autumn 60° to 70°—range 10°; winter 45° to 52°—range 7°. Yearly mean average from 45° to 80°.

The rainfall during the same seasons was—spring, 10 cubic inches; summer, 2 cubic inches; autumn, 3 cubic inches; winter, 10 cubic inches—total for the year, 25 cubic inches. Higher up the slopes of the range, the temperature would of course be lower, and the rainfall greater; hence it would not be difficult to select there a station which would combine the necessary moisture and warmth. These temperatures may be contrasted with those on the Neilgherries. Ootacamund is in the centre of a plateau, by no means a flat surface. The rains come in the southwest monsoon from May to September from the west, and at other times it receives the rain of the northeast monsoon. The total rainfall is from 65 to 75 inches. The mean temperatures range from 42° to 58°. At a station lower down on the range (Conover), the mean temperature is from 52° to 71°.

Anywhere between 34° and 37° in the western slopes of the Sierra Nevada, Dr. Antisell thinks a temperature similar to that of India may be obtained by ascending the range from 1500 to 2000 feet above its base. We believe with him that all the conditions of climate which would support the cinchona could be found immediately below the altitude of the *Sequoia*.

The American Medical Association therefore ask, in view of the foregoing facts, that the Congress of the United States would appoint a commission of scientific men for the following purpose:—

1. To determine what portion, if any, of the public domain of the United States will produce the cinchona, and which may be set apart for this purpose.

2. To determine what species may be best transplanted, and will furnish the greatest amount of the active principles.

3. That they be authorized to visit such South American countries as they may deem necessary in order to determine these points employ a competent botanist to assist them, and that our consuls in such States be instructed to further these investigations.

4. That they be empowered to negotiate for, and obtain a proper quantity of seeds and plants.

We would add to this that the Sacramento Medical Society has pledged itself, provided the requisite plants or seeds are furnished free of cost by the Government, to use every effort in endeavoring to find a proper habitat for the cinchona tree in California, and

to report the results of their experiments to the Agricultural Bureau at Washington. The "State Board of Agriculture," of California, through one of its members, has promised its co-operation in any plan which may be deemed most advisable for the accomplishment of the objects contemplated by the appointment of this committee.

LEMUEL J. DEAL, M. D., *Chairman.*
THOS. M. LOGAN, M. D.,
For the Committee.

By order of the Association,
GEORGE MENDENHALL, M. D.,
President.

WM. B. ATKINSON, M. D.,
Permanent Secretary,
1400 Pine Street, Philadelphia.

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